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RESEARCH METHODOLOGIES USED BY POSTGRADUATE AGRICULTURAL EDUCATION IN ESWATINI

ALFRED F. TSIKATI, MARIETTA P. DLAMINI & MUSA A. DUBE

Department of Agricultural Education and Extension, University of Eswatini, Manzini, Eswatini

ABSTRACT

Post-graduate student research is fundamental for the growth of a young discipline such as Agricultural Education. In Eswatini, there is no study conducted on methodologies used in post-graduate agricultural education students' research. This study sought to describe research methodologies used in masters' degree students in Agricultural Education at the University of Eswatini (UNESWA). The study was a desk research on agricultural education masters' degree theses completed from 1996 to 2017. The results of the study revealed that agricultural education research was positivistic, quantitative, basic and descriptive in nature and analysed mainly using descriptive statistics. It was recommended that there is a need for agricultural education students to conduct research that are explanatory, analytical and evaluative.

KEYWORDS: Agricultural Education, Post-Graduate, Research Methodology & Thesis

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Original Article

INTRODUCTION

Williams (1991) defines Agricultural Education as the community of scholarship between agriculture and education. It is the discipline that contributes to Agricultural Education systems by linking the technical areas of agriculture and the humanistic dimension (Barrick, 1988). Heren and Donahwe (1991) reckoned Agricultural Education in three ways: (i) the general formal knowledge of agriculture; (ii) course of study (in college / university / department of government) to prepare and assist teachers of agriculture in secondary schools and (iii) modern high school course dealing with agriculture. In Eswatini, Agricultural Education refers to those activities directed at the preparation of teachers of agriculture.

Agricultural Education is relatively a young discipline that emerged in the early 1900s (Williams, 1991). In a young discipline like Agricultural Education, research is important as its place among other fields of knowledge is not fully understood (Newcomb, 1993). Newcomb (1993) further stated that much of the research in Agricultural Education is accomplished by post-graduate (graduate) students. The term 'postgraduate' is often used to describe the further study undertaken by those who already have a first degree such as masters' or doctoral studies. However, post-graduate studies may also include certificate and diploma which are taught at a more academically demanding standard than undergraduate certificate and diploma (House, 2010).

In Eswatini, Agricultural Education began in 1973 (Gooday, 1974). Currently, Agricultural Education is offered as Modern Agriculture at: primary level [Grade 6 and Grade 7] (Ministry of Education and Training, 2013); junior secondary level [Form 1 –Form 3] and senior secondary level [Form 4 and Form 5] (Gooday, 1974). Agricultural Education at the college level adopts the generic approach, whereby; it is viewed as the scientific

study of the principles and methods of teaching and learning as they pertain to agriculture. Also Agricultural Education is offered at the following vocational centres: Manzini Industrial Training Centre, Siteki Industrial Training Centre and Nhlangano Agricultural Skills-Training Centre. Agriculture Education is offered in other agricultural skill training centres such as Ngwempisi Agricultural Skills

Training Centre and Bosco Youth Training Centre. At the University of Eswatini, Agricultural Education is reckoned as activities directed at the preparation of teachers of agriculture. It falls under the Department of Agricultural Education and Extension in the Faculty of Agriculture (University Calendar, 2016). Students in the Department are enrolled for first degree, masters' degree and doctorate degree (University of Swaziland Calendar, 2011). All the programmes have both course work and research work. However, the strength of research varies with the level of the programme. More extensive research is emphasised at the post-graduate level than at the undergraduate level.

Kaur and Sidhu (2009) found that the provision of post-graduate education in many developed and developing countries has been in response to increasing demands of students to enhance their career prospects. The provision of post-graduate education in many countries often takes the form of graduate studies either by mixed coursework and research or research only (Kaur and Sidhu, 2009). Williams (1997) reported that masters' degree programs require a thesis or other creative work and doctoral programmes require a dissertation with prerequisite courses in research methodology and statistics. Williams also reported that no single agenda can apply to the rich diversity of graduate students in Agricultural Education and it should be so. However, was quick to say that the need for focused research cannot be denied. Agricultural Education research is perceived by external groups as lacking focus (Buriak and Shinn, 1989), and a study conducted internally to the profession confirmed this finding (Buriak and Shinn, 1993).

Mannebach, et al. (1984) when analysing research methodology reported in Agricultural Education suggested that researchers must continually examine their research and scholarly activities as they point at what is being done and the direction where the discipline is going. Shinn, et al. (2008, p122) found that "*there is a need to re-examine Agricultural Education in a future that has already happened*." This assertion was based on advice by Drucker (1997) that it is possible and fruitful to identify major events that have already happened to predict effects in the future. Thus, a need arose to analyse the methodologies used by researchers in the discipline (Dyer, et al., 2003). Scholars are making calls to examine the essence of research in Agricultural Education (Edgar, et al., 2008a). Correspondingly, a need arose for Agricultural Education to understand where the discipline has been in order to focus future research (Edgar et al., 2008a). Knight (1984) and Radhakrishna and Xu (1997) on analysis of research conducted in Agricultural Education provide caution and evident need for more variety in research methodology and design in the discipline.

Existing literature indicate that the type of research conducted in Agricultural Education is mainly positivistic (Wardlow, 1989). Wardlow further concluded that other research paradigms such as interpretivist and critical science were not common in the discipline. Not to mention the pragmatism paradigm. The research conducted in Agricultural Education had been mostly quantitative, followed by qualitative and then mixed methods approach (Dyer, et al., 2003; Edgar, et al, 2008a; Edgar, et al., 2008b). Dyer et al. (2003a) further revealed that the type of research conducted in Agricultural Education in the U. S. A. was applied research, however descriptive survey is the most popular research design, followed by correlation research design (Dyer et al., 2003; Edgar, et al., 2008a). In Eswatini, previous studies revealed that research conducted were quantitative employing survey research design (Dube and Zwane, 2002; Gwebu, 2010; Mazibuko, 1997; Shabangu, 1991)

Gwebu (2010) and Zwane (2001) reported that undergraduate Agricultural Education students at the University of Eswatini were using questionnaires for data collection, while agriculture teachers were the main source of data (Dube and Zwane, 2002; Gwebu, 2010; Mazibuko, 1997; Shabangu, 1991). Gwebu (2010) also revealed that undergraduate agricultural education students at the University of Eswatini (Swaziland) were used probabilistic more than non-probabilistic sampling methods.

Data analysis is another methodology issue in agricultural education research. Data analysis is guided by the type of data collected: quantitative or qualitative data. Analysing quantitative data involves the use of statistical analysis. According to Miller (1998), three categories of statistics are found: descriptive, correlation or regression and inferential. Conversely, qualitative data analysis has three overarching types: content analysis, constant comparative method and bracketing (Tesch, 1990). Data analysis in mixed methods is both numerical and textual or pictorial (Ivanakova, et al., 2007). Bowen, Rollins, Baggett and Miller (1990) found that most articles in the Journal of Agricultural Education were analysed quantitatively using descriptive statistics. Generally, research conducted by undergraduates in Eswatini had been analysed using mainly inferential statistics (Gwebu, 2010; Mazibuko, 1997, Shabangu, 1991; Zwane, 2001). Few studies were reported to have used correlation and descriptive statistics (Mazibuko, 1997, Shabangu, 1991). Some studies did not use statistics at all as they were qualitative in nature (Mazibuko, 1997, Shabangu, 1991; Zwane, 2001). Gwebu (2010) recommended that researchers should move to the prediction and control levels of the research continuum when analysing data.

In Eswatini, the masters' and PhD programme were introduced at the University of Eswatini in 1994 and 2011, respectively (University of Swaziland Calender, 1994, 2011). Students enrolled for post-graduate programmes in Agricultural Education at this University are required to undertake coursework and thesis (masters' students) and dissertation (doctoral students). All the students' theses are available at the University Library as unpublished theses and dissertations. A number of studies on Agricultural Education had been conducted as undergraduates' research projects at the University of Eswatini (Gwebu, 2010; Mathonsi, 2000; Mazibuko, 1997); Shabangu, 1991; Zwane, 2001). None of these studies targeted the methodologies used in post-graduate agricultural education theses. The last analysis on methodologies used by undergraduate agricultural education students was conducted about two decades ago by Dube and Zwane (2002). Yet, the future of agricultural research depends on the acquisition and application of new knowledge (Dyer et al., 2003) generated by post-graduate students among researchers (Newcomb, 1993).

The purpose of this paper therefore, was to investigate the research methodologies used in masters' theses in Agricultural Education at the University of Eswatini. The objectives of the study were to: (i) describe the types of research conducted by masters' agricultural education students at the University of Eswatini; (ii) identify methods used to get study participants or respondents; (iii) identify data collection methods used in the master's theses; (iv) describe the sources of data; and (v) identify the data analysing procedures used.

METHODS

The study was descriptive employing desk review in data collection. The study was a census (N=60), focusing on methodologies employed in theses completed by masters' agricultural education graduates in the University of Eswatini within masters' programme existence (1996 to 2017).

The researchers sought permission in writing to collect data from UNESWA library and were granted by the Senior Assistant Librarian at the Luyengo Campus in the University of Eswatini. All the 60 theses were accessible. The methodologies examined by the study were: the research philosophies, research approaches, research designs, data sources, sampling procedures, data collection methods and data analyses. The validity of the instrument was ensured through the use of two peers / experts from the Department of Agricultural Education, Faculty of Agriculture at the University of Eswatini. Data analysis was performed using frequencies and percentages.

RESULTS AND DISCUSSIONS

Types of Research Conducted by Agricultural Education Masters' Students

Table 1 reveals that most of the masters theses employed positivism philosophy (n=26, 45.6%); quantitative research approach (n=27, 47.4%); and correlational type of research (n=22, 38.6%). The research conducted was basic (n=55, 96.5%) and also descriptive (n=27, 47.4%). The results of this study on the types of research conducted in Agricultural Education confirm existing knowledge. Wardlow (1989) reported that the type of research conducted in Agricultural Education is mainly positivistic and wanting in interpretivist and critical science research paradigms. Also, the agricultural education research has dominantly been quantitative (Dyer, et al., 2003; Edgar, et al., 2008a; Edgar, et al., 2008b). The results also revealed that the design used is predominantly correlational; yet, literature reveals that the design employed in Agricultural Education is mainly descriptive (Dube and Zwane, 2002; Dyer et al., 2003; Edgar, et al., 2008b; Gwebu, 2010; Mazibuko, 1997; Shabangu, 1991). Dyer et al. (2003) further revealed that the type of research conducted in Agricultural Education in the U. S. A. was applied; yet in Eswatini, is basic. This creates a need for Agricultural Education in Eswatini to move from basic to applied research. Also, the results imply that research in Agricultural Education should be conducted beyond the positivism, quantitative and descriptive stance. Thus, Edgar et al. (2008a) concluded that a need exists to engage in a more rigorous research methodologies to answer the "why" as well as the "what is" questions.

Table 1: Types of Research Conducted by Agricultural Education Masters' Degree Graduates

Type of Research	f	%
Philosophy		
Positivism	26	45.6
Constructivism	4	7
Pragmatism	25	43.6
Transformative	2	3.5
Approach		
Quantitative	27	47.4
Qualitative	5	8.8
Mixed	25	43.9
Design		
Descriptive	15	24.6
True experimental	0	0
Quasi-experimental	0	0
Ex-post facto	16	28
Case study	0	0
Qualitative	4	7
Correlation	22	38.6
Triangulation	1	1.8
Research Type - Outcome		
Basic	55	96.5
Applied	2	3.5

Table 1: Contd.,		
Research Type -Purpose		
Exploratory	7	12.3
Descriptive	27	47.4
Explanatory	20	35.1
Analytical	3	5.3

Methods Used to Select Study Participants or Respondents

Most of the respondents or participants for agricultural education research were reached through sampling (n=39, 65.0%) instead of a census (n=21, 35.0%) (see Figure 1).

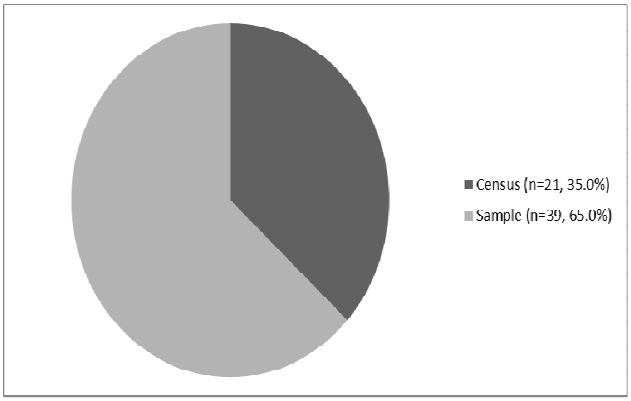

Figure 1: Group Studied by Agricultural Education Masters' Degree Graduates

Table 2 depicts that even though fewer theses employed the qualitative research approach or designs; the purposive sampling design was mainly used in the qualitative strand of the mixed methods. Stratified random sampling (n=15, 23.8%) and simple random sampling (n=13, 20.6%) were the most probabilistic sampling methods used.

Table 2: Sampling Designs Used in Agricultural Education Post-Graduates' Theses

Type of Research	f	%
Simple random	13	20.6
Stratified random	15	23.8
Systematic random	2	3.17
Cluster random	3	4.76
Purposive / Judgemental	27	42.9
Accidental or Convenience	2	3.17
Snowballing	1	1.599

Sources of Data Used in the Masters' Theses

Table 3 depicts that educational professionals (n=40, 44.4%) were the main data sources for the agricultural education masters' degree theses. These educational professionals included lecturers or educators, teachers, school administrators, instructors, inspectorate, and curriculum designers or evaluators. It can be observed that even though learners (n=13, 14.4%) and documents (n=8, 8.9%) have been used; a need to exploit deeper emerges. Parents, community members, farmers and retired staff (n=12, 13.3%), policy makers and business people (n=2, 2.2%), and private sector / NGOs officers and workers (n=5, 5.5%) were among the least exploited data sources in the agricultural education masters' in Eswatini. Affirmatively, research conducted so far used educational professionals as the main source of data in Agricultural Education (Dube and Zwane, 2002; Gwebu, 2010; Mazibuko, 1997; Shabangu, 1991). Sources of data such as

parents, private sector, documents and farmers were spared. Therefore, a need exists to double efforts toward reaching other sources of data in order to have a balanced picture on the state of knowledge in the discipline.

Table 3: Data Sources Used in Masters' Degree in Agricultural Education Theses

Data Analysis	f	%
Educational professionals	40	44.4
Learners	13	14.4
Parents, community members, farmers and retired staff	12	13.3
Policy makers and business people	2	2.2
Agriculture officers and workers	10	11.1
Private sector / NGOs officers and workers	5	5.5
Documents	8	8.9

Further analysis was performed to establish the exact educational professionals that were used by the agricultural education students in their theses. Table 4 reveals that teachers (mainly agriculture teachers) were used as the main data source (n=39, 46.4%). The appearance of each study was recorded; hence, the total number of the professionals is more than the number of the theses. It is also interesting to note than the second highest numbers of educational professionals studied were school administrators such as head teachers and deputy head teachers; who are basically teachers. It can be noted from the results that teachers (especially agriculture teachers) had been over-researched. A need arose to refocus research into various data sources in the educational sector, such as administrators, in-service personnel, instructors, inspectorate, educators, and curriculum designers or evaluators. The results of the study confirm those from Dube and Zwane (2002); Gwebu (2010); Mazibuko (997); and Shabangu (1991).

Table 4: Education Professionals as Data Sources Used by Masters' Degree Graduates in Agricultural Education

Data Analysis	f	%
Teachers	34	53.1
Administrators	7	10.9
Educators / lecturers	6	9.4
Inspectorate	5	7.8
Instructors	5	7.8
Curriculum designers / evaluators	4	6.3
Regional Education Officers	1	1.6
Swaziland Association of Teachers	1	1.6
In-service training	1	1.6

Data Collection Methods Used in the Theses

A total of 105 data collection methods were used by the agricultural education graduates in the theses. This number of data collection methods used is larger than the number of graduates because some of the graduates were using more than one data collection method. Table 5 indicates that most of the theses (n=55, 52.4%) conducted by the masters' degree graduates in Agricultural Education used a questionnaire. Since a questionnaire is mainly used in quantitative studies; it was bound to dominate in the theses in Agricultural Education as the theses mainly used the quantitative and mixed methods approach which also has a quantitative strand. Generally, research in Agricultural Education is positivistic, quantitative and descriptive in nature; hence, the most used data collection tool is the questionnaire. Such results were also reported by Gwebu (2010).

Table 5: Data Collection Methods Used in Agricultural Education Masters' Degree Graduates

Data Analysis Method	f	%
Questionnaire	55	52.4
Nominal Group Technique	15	14.7
Focus Group Discussion	12	11.4
Interview	11	10.5
Content Analysis	7	6.7
Delphi technique [modified]	3	2.9
Observation	2	1.9

Data Analysing Procedures Used in Masters' Thesis

A total of 197 data analysing methods were used by the agricultural education graduates in the masters' degree theses. Table 6 indicates that most of the theses (n=58, 29.4%) conducted by the masters' degree graduates in Agricultural Education used descriptive statistics. Correlational statistics (n=44, 22.3%), inferential statistics (n=42, 21.3%) and predictive statistics (n=34, 17.3%) were also dominating in the agricultural education graduates' theses. Contrary, the following statistics were the least used in the agricultural education masters' degree graduates theses: non-parametric statistics such as chi-square (n=1, 0.5%) and factor analysis (n=1, 0.5%). Qualitative analyses that were also under-utilised in the masters' degree graduates' theses were: thematic analysis (n=10, 5.1%) and constant comparison method (n=2, 1.0%). This emanates from the fact that generally, the theses were not qualitative, but mainly quantitative. These results are consistent with studies conducted in Agricultural Education. Bowen et al. (1990) found that most articles were analysed quantitatively using descriptive statistics. Similarly, research conducted in Eswatini has been analysed using mainly descriptive statistics (Gwebu, 2010; Mazibuko, 1997, Shabangu, 1991; Zwane, 2001). Few studies were reported to have used correlation and descriptive statistics (Mazibuko, 1997, Shabangu, 1991). Thus, Gwebu (2010) recommended that researchers should move to the prediction and control levels of the research continuum when analysing data.

Table 6: Data Analysis Used by Masters' Degree Graduates in Agricultural Education Theses

Data Analysis	f	%
Descriptive statistics	58	29.4
Inferential statistics	42	21.3
Correlation statistics	44	22.3
Predictive statistics	34	17.3
Borich's model	5	2.5
Thematic analysis	10	5.1
Constant comparison	2	1.0
Factor analysis	1	0.5
Non-parametric – chi square	1	0.5

CONCLUSIONS AND RECOMMENDATIONS

The study concluded that the research methodologies used in masters' degree theses in Agricultural Education at the University of Eswatini were basically positivistic, quantitative, basic and descriptive in nature. Agriculture teachers were the main sources of data. Purposive and simple random were the common sampling methods. The study also concluded that the questionnaire was the most used data collection method and descriptive statistics was the most used analysing tool.

The study recommended that the post-graduates in agricultural education research at the University of Eswatini should include: (i) pragmatism and social constructivism philosophy; (ii) qualitative and mixed approaches; (iii) applied research; and (iv) analytical, evaluative and explanatory research. Furthermore, effort should be made to tap into diverse sources of data such as parents, documents, and school administrators. The choice of varied sources of data would allow the use of varied sampling and data collection methods. A need arose to go beyond descriptive statistics to inferential and predictive statistics in data analysis.

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